

BLM LIBRARY



88069512

QL
677.78
.H37
2004

NESTING SUCCESS AND PRODUCTIVITY OF KEY RAPTOR SPECIES

AND PRELIMINARY HERPTILE SURVEY,

KEVIN RIM RAPTOR STUDY AREA, TOOLE COUNTY, MONTANA, 2004

Challenge Cost Share Progress Report to:

Bureau of Land Management



Great Falls District

QL
677.78
.H37
2004



#91073582

1088069512

QL
677.78
H37
2004

ABSTRACT

Nesting success and productivity of Ferruginous Hawks (*Buteo regalis*), Prairie Falcons (*Falco sparverius*), and Golden Eagles (*Aquila chrysaetos*) in the Kevin Tim Rector Study Area (KTRSA) of northern Toole County, Montana were determined between 30 June and 2 July 2004. On 30 June a general area resurveys for reptiles and amphibians was conducted, while surveys were conducted on 16-17 August 2004. Ten Ferruginous Hawk breeding areas produced >30 young, 10 Prairie Falcon breeding areas produced >20 young, and 2 Golden Eagle breeding areas produced 3 young. Number of successful Ferruginous Hawk nests in the Primary Study Area (PSA) declined from 1988 to 2004 ($P = 0.019$). No Ferruginous Hawk nestlings were banded in 2004 due to advanced age of nestlings. Two Red-tailed Hawks (*Buteo jamaicensis*) produced at avg 3 young. Three Swainson's Hawks (*Buteo swainsoni*) were located during surveys. No systematic surveys for white-tailed jackrabbits (*Lepus townsendii*) and Abert's ground squirrels (*Spermophilus aberti*) were conducted, but the species were encountered. The Plains pocket gopher (*Thomomys talpoides*) and the Western rattlesnake (*Crotalus viridis*). A more comprehensive survey of the raptor and amphibian community will be attempted by conducting surveys in the future. Oil production in KTRSA may have negative impacts on the raptor and amphibian community.

AI Harmata, Marco Restani¹, and Dennis Flath²

Department of Ecology

Fish & Wildlife Program

Montana State University

Bozeman 59717

21 October 2004

¹Current address, Dept. of Biological Sciences, St. Cloud State University, St. Cloud, MN 56301-4498

²Current address, APEX Environmental, 365 W. River Rock Road, Belgrade, MT 59714

BLM Library
Bldg. 50
Denver Federal Center
P.O. Box 25047
Denver, Colorado 80225

TABLE OF CONTENTS

ABSTRACT

Nesting success and productivity of Ferruginous Hawks (*Buteo regalis*), Prairie Falcons (*Falco mexicanus*), and Golden Eagles (*Aquila chrysaetos*) in the Kevin Rim Raptor Study Area (KRRSA) of northern Toole County, Montana were determined between 30 June and 2 July 2004. On 30 June a general area reconnaissance for reptiles and amphibians was conducted, while searches were conducted on 16-17 August 2004. Ten Ferruginous Hawk breeding areas produced ≥ 30 young; 10 Prairie Falcon breeding areas produced ≥ 20 young, and 2 Golden Eagle breeding areas produced 3 young. Number of successful Ferruginous Hawk nests in the Primary Study Area (PSA) declined from 1988 to 2004 ($P = 0.019$). No Ferruginous Hawk nestlings were banded in 2004 due to advanced age of nestlings. Two Red-tailed Hawk (*Buteo jamaicensis*) produced ≥ 1 and 3 young. Three Swainson's Hawks (*Buteo swainsonii*) were incubating during surveys. No systematic surveys for white-tailed jackrabbits (*Lepus townsendii*) and Richardson's ground squirrels (*Spermophilus richardsonii*) were conducted. Only two species of herptofauna were encountered, the Plains spadefoot toad (*Spea bombifrons*) and the Western rattlesnake (*Crotalus viridis*). A more comprehensive view of the reptile and amphibian community will be attained by conducting surveys monthly, from May through August in the future. Oil production in KRRSA may have negatively impacted the reptile and amphibian community, reducing density of some species and compromising species diversity. A comprehensive and detailed research plan incorporating an appropriate control area is recommended to determine the magnitude of this impact. Any attempt to promote Kevin Rim public lands as a destination for any type of spring-summer recreational activity should be discouraged.

TABLE OF CONTENTS

ABSTRACT.....	i
DISCUSSION.....	ii
TABLE OF CONTENTS.....	ii
MANAGEMENT RECOMMENDATIONS.....	iii
LIST OF TABLES	iii
LIST OF FIGURES.....	iv
LITERATURE CITED.....	12
INTRODUCTION.....	1
APP 2004 Objectives.....	2
Raptors.....	2
Herptiles	2
STUDY AREA.....	2
METHODS.....	3
Raptors	3
Herptiles	4
RESULTS	4
2004 Raptor Nest Success and Productivity	4
Ferruginous Hawks.....	4
Long-term Success and Productivity	6
Prairie Falcons	6
Golden Eagles.....	8
Other Diurnal Raptors	8

Prey Availability	9
Herptiles	9
DISCUSSION.....	11
MANAGEMENT RECOMMENDATIONS	12
Table: Raptors	12
Herptiles	12
LITERATURE CITED.....	12
APPENDIX TABLES.....	15
Table 4. Non-venomous reptile and amphibian species types, times, and records, Kevin Rim Raptor Study Area, 2004.....	10
Table 5. Raptor and amphibian sightings, Kevin Rim Raptor Study Area, 2004	10
Appendix Table 1. Location, minimum productivity (nestlings >4 wks old), and plumage descriptions (N = normal, M = mottled) of nesting Ferruginous Hawks, Kevin Rim Raptor Study Area, 2004	15
Appendix Table 2. Location and productivity (nestlings >4 wks old) for Prairie Falcon breeding areas located within the Kevin Rim Raptor Study Area, 2004	16
Appendix Table 3. Location and productivity (nestlings >4 wks old) for Golden Eagle (prefix G), Swainson's Hawk (prefix S), and Red-tailed Hawk (prefix R) breeding areas located within the Kevin Rim Raptor Study Area, 2004	17

APPENDIX A

Tables

Appendix C

APPENDIX B

Tables

Appendix D

LITERATURE CITED

APPENDIX TABLES

LIST OF TABLES

Figure 1. Kevin Rim Raptor Study Area, northern Teton County, Montana.	3
Table 1. Reproductive performance of Ferruginous Hawks in the Kevin Rim Raptor Study Area (KRRSA), 2004.....	4
Kevin Rim Raptor Study Area, 2004.....	3
Table 2. Reproductive performance of Prairie Falcons in the Kevin Rim Raptor Study Area (KRRSA), 2004.....	6
Ferruginous Hawk pairs and productivity (total young produced) in the Prairie Falcon	
Table 3. Minimum Golden Eagle and other Buteo hawk activity in the Kevin Rim Raptor Study Area, 2004.....	9
Figure 4. Breeding status and activity of Prairie Falcons, Kevin Rim Raptor Study Area, 2004.....	7
Table 4. Non-vehicular reptile and amphibian search types, times, and results, Kevin Rim Raptor Study Area, 2004.....	10
Prairie Study Area, 2004. Golden Goshawks 3 and 4 (% within 100' and	
Table 5. Reptile and amphibian encounters, Kevin Rim Raptor Study Area, 2004.....	10
now to observations adjacent to sampling. 2004. Golden Goshawks 3 and 4 (% within 100' and	
Appendix Table 1. Location, minimum¹ productivity (nestlings >4 wks old), and plumage descriptions (N = normal, M = melanistic) of nesting Ferruginous Hawks, Kevin Rim Raptor Study Area, 2004.....	15
Appendix Table 2. Location and productivity (nestlings >4 wks old) for Prairie Falcon breeding areas located within the Kevin Rim Raptor Study Area, 2004.	16
Appendix Table 3. Location and productivity (nestlings >4 wks old) for Golden Eagle (prefix G), Swainson's Hawk (prefix S), and Red-tailed Hawk (prefix R) breeding areas located within the Kevin Rim Raptor Study Area, 2004.	17

NET OF TAPES

1. *Wetland vegetation in the Keweenaw Peninsula, Michigan*. 1993
SOOS, (A287K) area

2. *Wetland vegetation in the Keweenaw Peninsula, Michigan*. 1993
SOOS, (A287K) area

3. *Wetland vegetation in the Keweenaw Peninsula, Michigan*. 1993
SOOS, (A287K) area

4. *Wetland vegetation in the Keweenaw Peninsula, Michigan*. 1993
SOOS, (A287K) area

5. *Wetland vegetation in the Keweenaw Peninsula, Michigan*. 1993
SOOS, (A287K) area

6. *Wetland vegetation in the Keweenaw Peninsula, Michigan*. 1993
SOOS, (A287K) area

7. *Wetland vegetation in the Keweenaw Peninsula, Michigan*. 1993
SOOS, (A287K) area

8. *Wetland vegetation in the Keweenaw Peninsula, Michigan*. 1993
SOOS, (A287K) area

**INTRODUCTION
LIST OF FIGURES**

Figure 1. Kevin Rim Raptor Study Area, northern Tool County, Montana.	3
Figure 2. Breeding success and minimum productivity (see text) of Ferruginous Hawks, Kevin Rim Raptor Study Area, 2004.....	5
Figure 3. Regression of number of successfully breeding (≥ 1 young of advanced age) Ferruginous Hawk pairs and productivity (total young produced) in the Primary Study Area portion of the Kevin Rim Raptor Study Area, 1988 - 2004.....	6
Figure 4. Breeding success and of Prairie Falcons, Kevin Rim Raptor Study Area, 2004.7	
Figure 5. Location and minimum productivity (see text) of other raptor pairs, Kevin Rim Raptor Study Area, 2004. Golden Eagle pairs 3 and 4 (# within icon) were successful but pairs 1 and 2 were absent (see Appendix Table 3). Young produced are in parentheses adjacent to species icon.....	8

LAT DR PIGUELE

Ε.....επιστρέψαντας την πόλη στην Ελλάδα μετά την αποχώρηση των Γαλλών στις 25 Αυγούστου 1828.

Σ.....επιστρέψαντας την πόλη στην Ελλάδα μετά την αποχώρηση των Γαλλών στις 25 Αυγούστου 1828.

(εργα δεκαπενταύγουστος 1828) γνωστείς ως πατέρας της πολιτείας της Κοζάνης. Στην Ελλάδα γέννησε στην Κοζάνη την ημέρα της 25 Αυγούστου 1828. Τον ίδιο χρόνο στην Κοζάνη γεννήθηκε και ο Ιωάννης Λαζαρίδης.

Σ.....επιστρέψαντας την πόλη στην Ελλάδα μετά την αποχώρηση των Γαλλών στις 25 Αυγούστου 1828.

Ε.....επιστρέψαντας την πόλη στην Ελλάδα μετά την αποχώρηση των Γαλλών στις 25 Αυγούστου 1828.

INTRODUCTION

The Kevin Rim escarpment in northern Toole County, Montana, provides nesting habitat for a variety of raptors (Dubois 1988). The Bureau of Land Management (BLM) designated the Kevin Rim a "Key Raptor Area" and an "Area of Critical Environmental Concern" (Williams and Campbell 1988) to provide added habitat protection for raptors, especially sensitive and declining species. Ferruginous Hawks (*Buteo regalis*), Prairie Falcons (*Falco mexicanus*), and Golden Eagles (*Aquila chrysaetos*) are designated "Species of Special Concern" in Montana (Flath 1991) and are considered key species for investigation of aspects of population dynamics in KRRSA. Montana Natural Heritage Program (1999) also lists the Ferruginous Hawk as a Species of Special Concern and the U.S. Fish & Wildlife Service (USFWS) now considers it and the Prairie Falcon species of Conservation Concern (USFWS 2003).

Initial monitoring and nestling raptor banding efforts in the vicinity of the Kevin Rim escarpment began in 1988. Since then, several intensive studies have focused aspects of raptor ecology (Dubois 1988, Harmata 1991, VanHorn 1993, Zelenak 1996, Harmata and Zelenak 1996, Zelenak et al. 1997). Number of successful Ferruginous Hawk nests in KRRSA declined between 1988 and 2003 (Harmata and Jaffe 2003). Banding in portions of KRRSA was suspended in 1999 and number of annual surveys reduced in 2000 due to suspected negative impacts on Ferruginous Hawk productivity. Coincidentally, more effort was directed at banding in Ferruginous Hawk nests where banding had not previously occurred. Colorbanding Prairie Falcon and Ferruginous Hawk nestlings began in 1995. However, due to the lack of subsequent observations of colorbands, colorbanding was suspended in 2000.

Reptiles and amphibians are sensitive to habitat conditions and changes, as well as changes in wildlife community composition and abundance. Furthermore, they constitute a significant portion of environmental biomass and are critical components of the food web (Maxell 2000, Koch and Peterson 1995). In particular, reptiles often are prey for a wide variety of omnivores and carnivores (Zug 1993), including ferruginous hawks which is the focal species for studies in the Kevin Rim area.

~~2. Record use of habitat features by reptile and amphibian species~~

Some amphibian populations in Montana have recently, or are currently, undergoing declines and extirpations (Reichel and Flath 1995, Carey 1993, Corn and Fogelman 1984). Direct and indirect impacts from a variety of human activities may affect the viability of reptile and amphibian populations in Montana (Joslin and Youmans 1999).

~~STUDY AREA~~

Occurrence of 11 species (5 amphibian, 6 reptile) have been recorded in Toole County, but an additional species of each reptile and amphibian may occur, but have not yet been documented (Maxell et al. 2003). Several species records occur in the extreme southeastern portion of the county, on or near Tiber Reservoir (Rauscher 2000). Only 3 species have been previously recorded in the Kevin Rim area (Maxell et al. 2003).

The Northern leopard frog (*Rana pipiens*) is the only species of special concern suspected to occur in Toole County. This species has undergone significant declines throughout much of its North American range in recent years. Formerly abundant, it is now extinct or nearly so in western Montana (Reichel and Flath 1995). Status and trend are unknown in Toole County.

~~METHODS~~

2004 Objectives

~~Successful pairings (or nests) are more than double young~~

A. Raptors:

changes and improvements are available to assist communities and organizations as well as individuals in adapting community composition and abundance. Furthermore, such constituents are well known to play a role in ecosystem development (Bullock and Silvertown 1994). In September, we will continue our work in the area of community and ecosystem research to determine what is best for the Kavon River area.

Some additional information on the Kavon River area recently to the community, including activities along the river (Ranchar and Hall 1992; Gove 1993; Gove and Podoski 1994). Other and related topics now a variety of human activities such as off-road vehicle use (Youngman 1993).

Concerns of the people (2 surveys, 8 letters) have been recorded in Table 1. Only half of the responses to each topic and subtopic may occur, but just over half of the people documented (Hall et al. 2003). Several topics record documents in the extreme lower portion of the county, or in west Tippecanoe (Ranchar 2000). Only 3 species were particularly recorded in the Kavon River area (Makai et al. 2003).

The most interesting topic (Table 1) is the issue of species concern to citizens of Tippecanoe County. This species has undergone a single taxonomic change in status in recent years. formerly abundant, it is now declining rapidly to the point of extinction in western Monroe (Ranchar and Hall 1992). Some

Summary

A. R. Ranchar

- Raptors*
1. Determine location, success³, and productivity⁴ of Ferruginous Hawks, Prairie Falcons, and Golden Eagles nesting in KRRSA.

One survey for raptor success and productivity was conducted in 2004. To

minimize observer activity on raptor nest success, neither occupancy nor activity

- surveys (nor*
1. Determine relative abundance and distributional status of reptile and amphibian species, focusing on species of special concern.
 2. Record use of habitat features by reptile and amphibian species.
 3. Identify key, or critical habitat components.
 4. Identify potential habitat improvement and maintenance opportunities.
 5. Provide recommendations for further surveys and research.

successful, 6. June and 2
July 2004. All previously identified nest sites were checked and historical breeding areas
switched for new nests. Information on location and number of young of
advanced age in successful nests, and outcome of adults and progeny of Ferruginous

Hawks KRRSA is located approximately 32½ km north to northwest of the town of Shelby, Toole County, Montana (Fig. 1). The northeast corner of KRRSA includes the town of Sunburst, Montana. KRRSA includes a Primary Study Area (PSA) that has been surveyed annually since 1988, Rattlesnake Coulee, and immediately adjacent table lands (Flats) to the north, east, and south of PSA (Fig. 1). Prior to 1997, coverage of the Flats was cursory but increased in 1997 through 2004. In 1999, the Flats was divided into NE and SE sections (Fig. 1). Rattlesnake Coulee has been surveyed intermittently between 1988 and 1999, but completely since 1999. Buckley Coulee (north of Rattlesnake Coulee outside of KRRSA) was last surveyed in 2000.

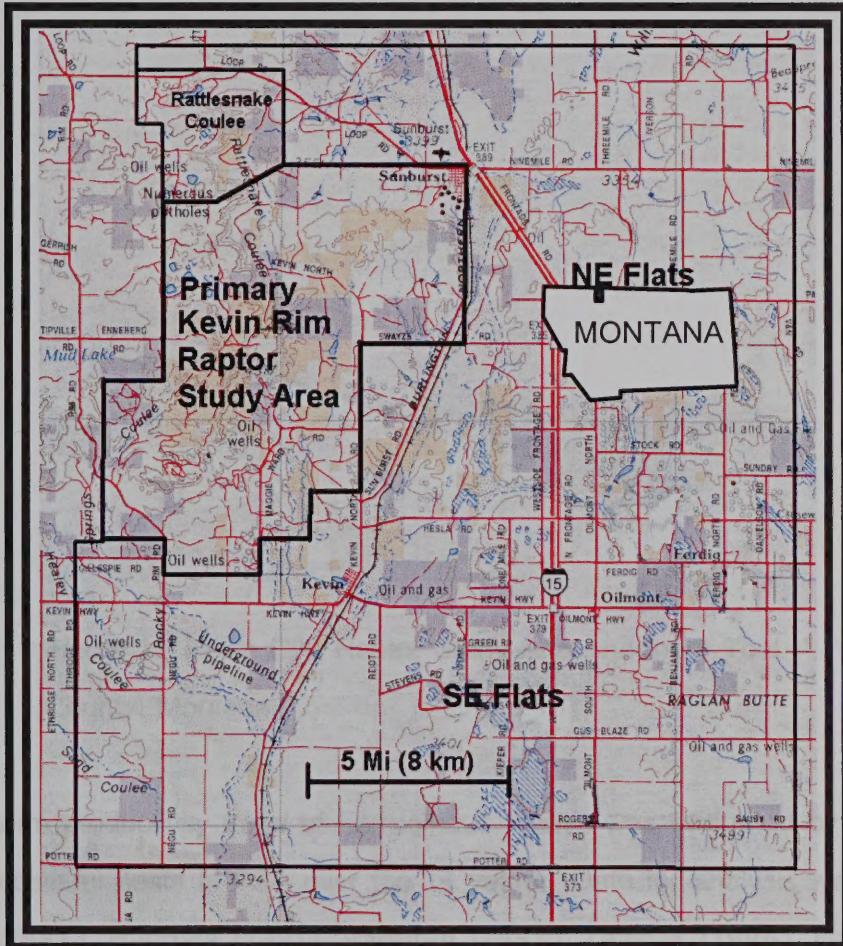
METHODS

³Successful pairs (or nests) are those that fledged young.

⁴Productivity is number of young fledged from successful nests.

Raptors

One survey for raptor success and productivity was conducted in 2004. To minimize effects of observer activity on raptor nest success, neither occupancy nor activity surveys (normally conducted in April) were conducted in 2004, nor did observers approach Ferruginous Hawk nests closer than 1 km to determine presence of nestlings, unless contained in the sample to be banded. Golden eagle and prairie falcon nestlings of advanced age ($>2/3$ growth) were considered to have fledged, *i.e.*, nests successful. All Ferruginous Hawk nests containing nestlings, regardless of age were considered successful. Surveys of success and productivity were conducted between 30 June and 2 July 2004. All previously identified nest sites were checked and historical breeding areas searched for new nests. Information gathered included location and number of young of advanced age in successful nests, and plumage of adults and progeny of Ferruginous Hawks.



Long-term studies have been conducted at the study area to determine the number of surviving nest sites and the number of fledged young. These data were compiled from (Dubois et al. 1995; Hamata et al. 1996, 1997; Zlomnicki 1996; Zlomnicki et al. 1997; Hamata et al. 1998, 1999; Hamata and Gade 2000), and Hamata and Jaffe (2001, 2003).

The KRRSA was visited June 30-July 2, and again August 16-17, 2004. On June 30 a general area reconnaissance was conducted, while reptile and amphibian searches were conducted on the other dates.

Search techniques included driving searches, timed walking searches of shorelines, upland habitats, and topographic features suspected of harboring reptiles and amphibians (Hendricks 1999), and listening for amphibian calling at a suspected breeding site. Locations of specimens encountered were recorded using a handheld GPS unit. Habitat use, breeding activity, life history stage, and number encountered were recorded as appropriate.

RESULTS

2004 Raptor Nest Success and Productivity

Ferruginous Hawk Figure 1. Kevin Rim Raptor Study Area, northern Toole County, Montana. (Table 1, Fig. 2). Actual number of young produced in PSA and Flathead County was probably higher than recorded because some nestings

most Long-term productivity trend of Ferruginous Hawks was evaluated by regressing number of successful nests in PSA over the 16 years. Data for analysis were compiled from (Dubois 1988), Harmata (1991), VanHorn (1993), Zelenak (1996), Harmata and Zelenak (1996), Zelenak et al. (1997), Harmata et al. (1998, 1999), Harmata and Gable (2000), and Harmata and Jaffe (2001, 2003).

Herptiles

Table 1. Reproductive performance of Ferruginous Hawks in the Kevin Rim Raptor Study Area (KRRSA), 2004

	Successful Nests	Young Produced ¹

The KRRSA was visited June 30-July 2, and again August 16-17, 2004. On June 30 a general area reconnaissance was conducted, while reptile and amphibian searches were conducted on the other dates.

Search techniques included driving searches, timed walking searches of shorelines, upland habitats, and topographic features suspected of harboring reptiles and amphibians (Hendricks 1999), and listening for amphibian calling at a suspected breeding site. Locations of specimens encountered were recorded using a handheld GPS unit. Habitat use, breeding activity, life history stage, and number encountered were recorded as appropriate.

RESULTS

2004 Raptor Nest Success and Productivity

Ferruginous Hawks.-Ten Ferruginous Hawk pairs were successful in KRRSA in 2004 producing a minimum of 30 young (Table 1, Fig. 2). Actual number of young produced in PSA and Rattlesnake Coulee was probably higher than recorded because some nestlings most likely were missed due to observation distance chosen to minimize observer disturbance. Production in the Flats was actual because nests were closely inspected to band nestlings. No Ferruginous Hawk nestlings were banded in 2004.

Table 1. Reproductive performance of Ferruginous Hawks in the Kevin Rim Raptor Study Area (KRRSA), 2004.

Successf	Young Produced ¹
----------	-----------------------------

T-16-15, 2004. On June 30-August 5, 2004, there was a second survey at KRRRA. During the survey, we conducted a questionnaire survey among local residents, while talking and interviewing people who could speak on the other side.

Because of various reasons such as living conditions, family size, and living environment, the proportion of respondents who had been living in the area for more than 10 years was 70% (Figure 1). In addition, the age group of 40-59 years old was the largest, accounting for 40% of the total population. Regarding gender, females were slightly more than males, accounting for 52% of the total population. Regarding education level, those with primary school education or less accounted for 40%, while those with secondary school education or higher accounted for 50%.

RESULTS

Population and Socio-Economic Status

According to the 2004 Population and Housing Census, the total population of KRRRA was 10,005, with 4,980 males and 5,025 females. The average household size was 3.02, with 2,610 households. The average age of the population was 41.5 years old. The highest age group was 40-59 years old, accounting for 3,450 individuals (34.5%). The average household size was 3.02, with 2,610 households. The average age of the population was 41.5 years old. The highest age group was 40-59 years old, accounting for 3,450 individuals (34.5%).

Table 1. Demographic characteristics of the population

Source: 2004 Population and Housing Census (KRRRA Area)

2004

Sex
Male
Female
Age Group
15-29
30-39
40-49
50-59
60-69
70-79
80-89
90-99

Education Level
Primary School
Secondary School
Higher Education

Nesting Area	Number of Pairs	Total	Per Pair
Primary Study Area	7	≥ 22	≥ 3.14
Rattlesnake Coulee	2	≥ 5	≥ 2.5
Flats	1	3	3.0
KRRSA	10	≥ 30	≥ 3.0

¹Approximate production-brood sizes were minimum.



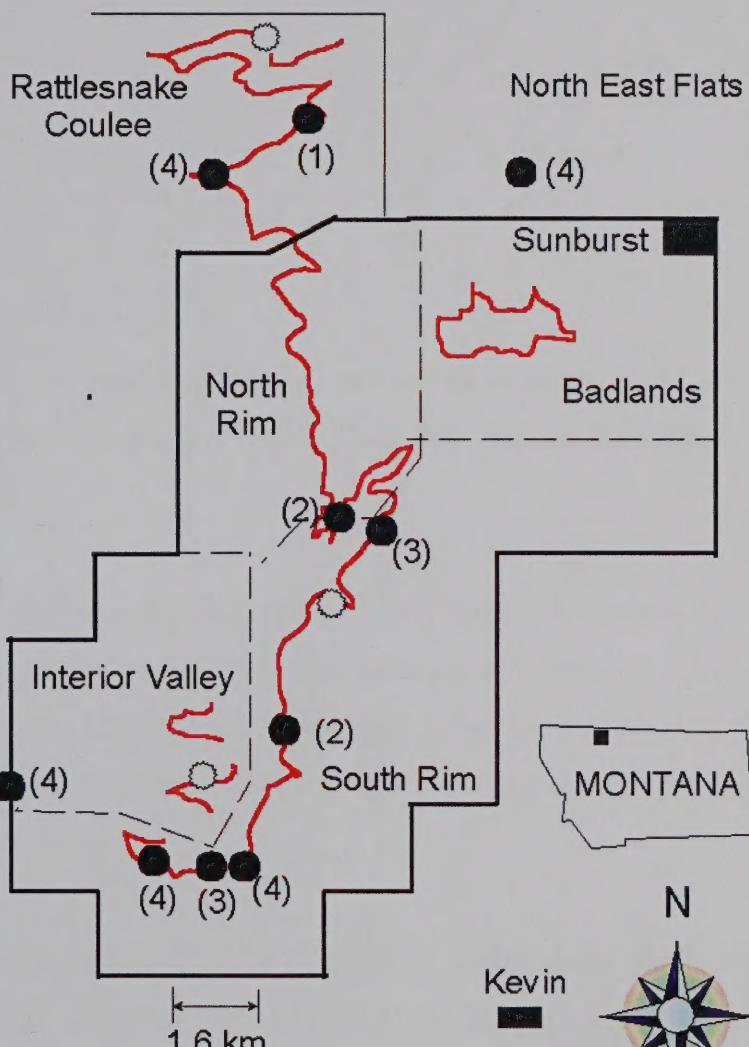
Total Area	Mean Area	Median Area	Min Area	Max Area
535	555	5	1	535
2.5	2.5	5	1	2.5
0.5	0.5	1	0.5	0.5

Additional Information - Prod size area minumum

FERRUGINOUS HAWK

● Productive (minimum # young)

○ Occupied
No Evidence of Activity



EXPLORATION HANDBOOK

● Potholes (minimum 5' apart)

○ Caves

■ The Beginning of All Life



Figure 2. Breeding success and minimum productivity (nest pairs) in Portuguese Hawks. X-axis: Pan-Paylor Study Area, 2004.

Long-term Success and Productivity. A mean of 7.3 nests ($n = 15$, $SE = 0.84$) have been successful pairs in the PPA since surveys began in 1988. However, number of successful nests in the PPA declined from 1988 to 2004 ($r = -0.595$, $P < 0.018$) (Fig. 3). If the trend continues, regression suggests no Portuguese Hawk pairs will be successful after 2012.

Mean productivity was 0.13 ($n = 15$, $SE = 2.801$) hawks of advanced age per year and although number of young produced per year appeared to decline also, slope of regression line of was not statistically different from zero ($r = -0.425$, $P > 0.117$), presumably due to the extreme variability in production year to year (Fig. 4).



Figure 2. Breeding success and minimum productivity (see text) of Ferruginous Hawks, Kevin Rim Raptor Study Area, 2004.

Long-term Success and Productivity. A mean of 7.8 nests ($n = 15$, $SE = 0.84$) have been successful per year in the PSA since surveys began in 1988. However, number of successful nests in the PSA declined from 1988 to 2004 ($r = -0.595$, $P = 0.019$)(Fig. 3). If the trend continues, regression suggests no Ferruginous Hawk pairs will be successful after 2012.

Productivity. Mean productivity was 21.1 ($n = 15$, $SE = 2.80$) hawks of advanced age per year and although number of young produced per year appeared to decline also, slope of regression line of was not statistically different from zero ($r = -0.422$, $P = 0.117$), presumably due to the extreme variability in production year to year (Fig. 3).

may have been hidden within errors.

Table 2. Reproductive performance of Prairie Falcons at the Kevin Rim Raptor Study Area (KRRSA), 2004

	Successful	Young Produced

	Nesting Area	Pa	Total	Fav Pair
Primary Study	6	29	215	
Avg	1.0	4.8	35.8	2.9
Rimrocke Crater	4	21	22.75	
KRRSA	10	270	23.0	

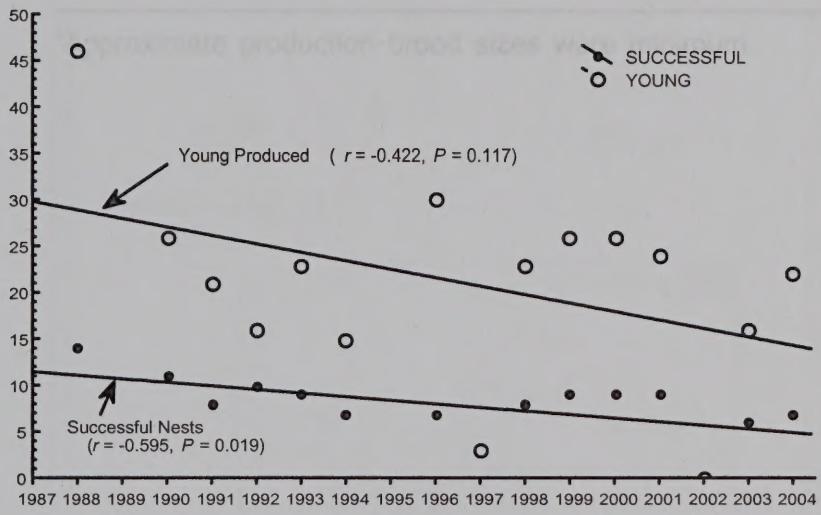


Figure 3.

e 3. Regression of number of successfully breeding (≥ 1 young of advanced age) Ferruginous Hawk pairs and productivity (total young produced) in the Primary Study Area portion of the Kevin Rim Raptor Study Area, 1988 - 2004.

Prairie Falcons.— Ten Prairie Falcon pairs were successful in 2004, producing a minimum of 20 young (Table 2, Fig. 4). Recorded productivity of falcons was undoubtedly lower than actual. Several newly fledged falcons were observed on ledges >50 m from the suspected eyrie and cliff racing along hillsides and escarpments. Also, additional eyasses may have been hidden within eyries.

Table 2. Reproductive performance of Prairie Falcons in the Kevin Rim Raptor Study Area (KRRSA), 2004.

Successful Nests Young Produced¹

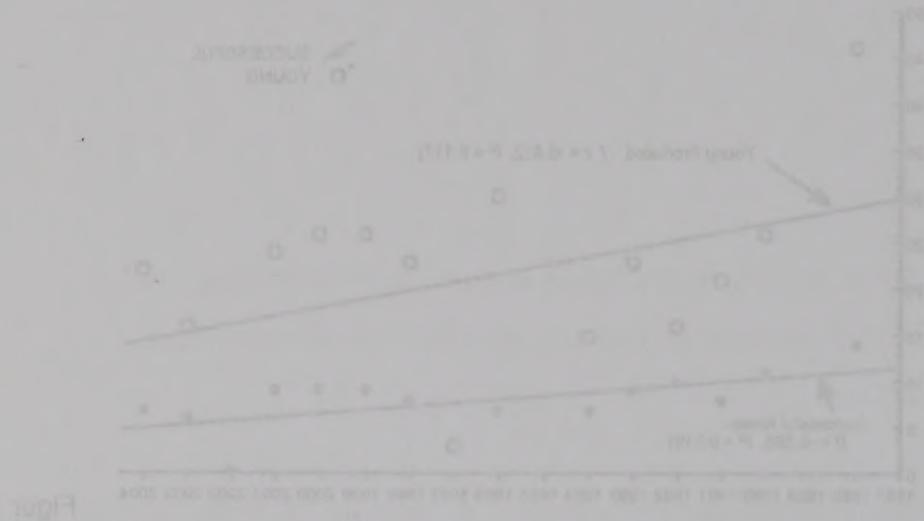


Fig 5. Relationship between Successes of Kavirajam and Young Productivity. It is found that there is a positive correlation between Young Productivity and Successes. The regression equation for Successes is $y = 0.0001x + 0.002$ and for Young Productivity is $y = 0.0002x + 0.002$.

minimum is 0.0001, and maximum is 0.0002. The regression equation for Successes is $y = 0.0001x + 0.002$ and for Young Productivity is $y = 0.0002x + 0.002$. The regression coefficient for Successes is 0.0001 and for Young Productivity is 0.0002. The regression coefficient for Successes is less than that for Young Productivity. This indicates that the success rate is higher than the young productivity rate. The regression coefficient for Successes is 0.0001 and for Young Productivity is 0.0002. The regression coefficient for Successes is less than that for Young Productivity. This indicates that the success rate is higher than the young productivity rate.

Table 5. Relationship between Successes of Kavirajam and Young Productivity

Table 5. Relationship between Successes of Kavirajam and Young Productivity

Table 5. Relationship between Successes of Kavirajam and Young Productivity

Nesting Area	ul Pairs	Total	Per Pair
Primary Study Area	6	≥ 9	≥ 1.5
Rattlesnake Coulee	4	≥ 11	≥ 2.75
KRRSA	10	≥ 20	≥ 2.0

¹Approximate production-brood sizes were minimum.



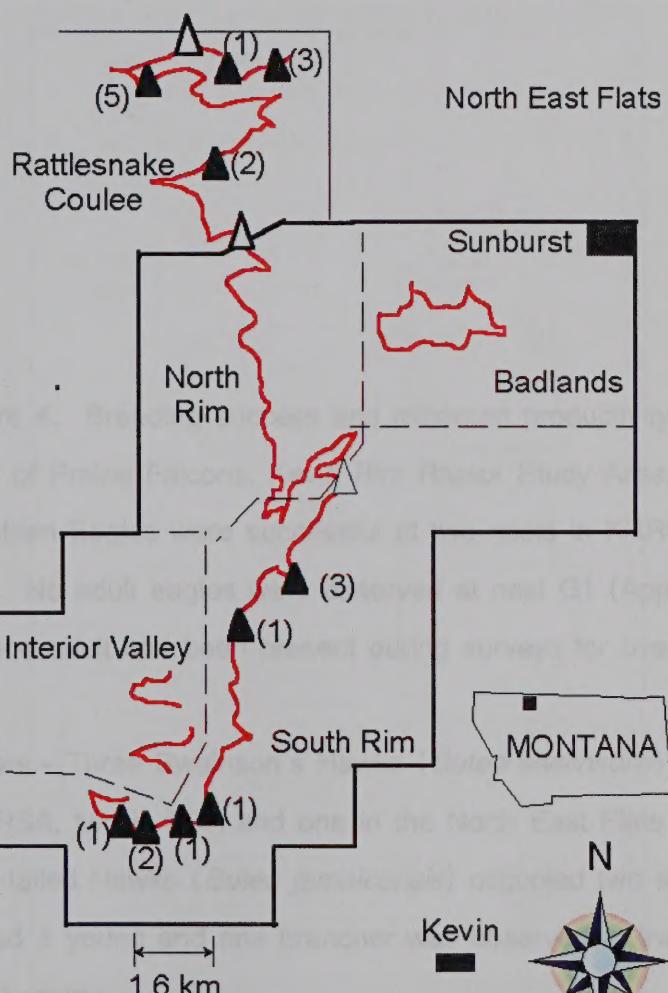
Total Pain	Total Pain	Lu Pain	Measuring Area
2.15	85	6	Humerus, Shoulder Arm
125.55	115	7	Humerus, Clavicle Shoulder
0.55	055	01	KRASV

Axonotmesis: complete loss of function with minimum neural regeneration potential

PRAIRIE FALCON

▲ Productive (minimum # young)

△ Occupied, (No Evidence of Activity)

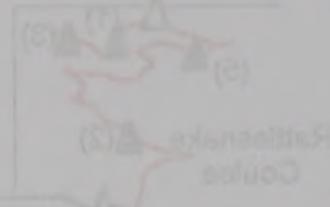


PRATIQUE FAUCON

(*Gymnophthalmus underwoodi*) ▲

(*Gymnodactylus geckoides*) △

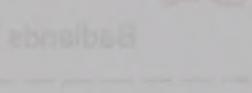
Mother East Africa



Kenya

North
Rift

Baobab



ANATOMY



Kidney

Bonny River



Impala Valley



(1) (2) (3) (4)

Scale



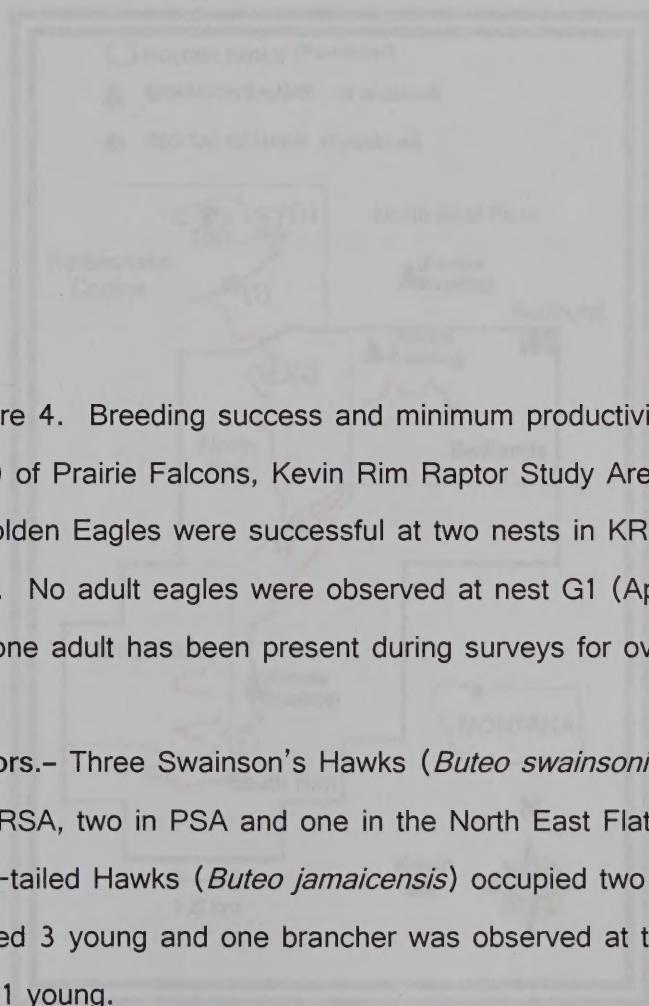


Figure 4. Breeding success and minimum productivity (see text) of Prairie Falcons, Kevin Rim Raptor Study Area, 2004.

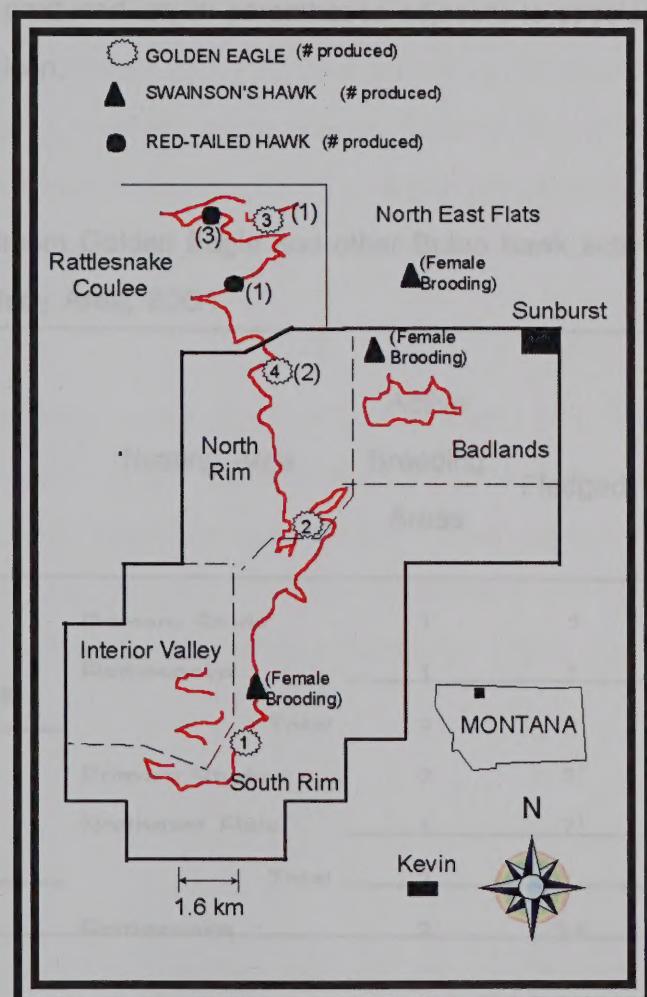
Golden Eagles.--Golden Eagles were successful at two nests in KRRSA (Fig. 5), producing 3 eaglets. No adult eagles were observed at nest G1 (Appendix Table 2), a site where at least one adult has been present during surveys for over a decade.

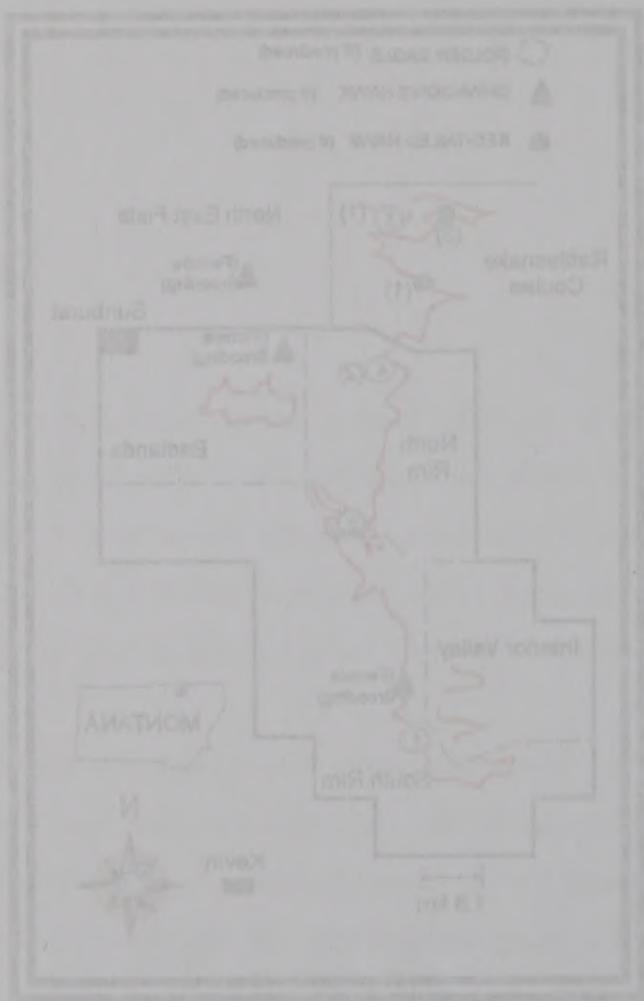
Other Diurnal Raptors.-- Three Swainson's Hawks (*Buteo swainsonii*) were incubating at different sites in KRRSA, two in PSA and one in the North East Flats (Fig. 5). Production was unknown. Red-tailed Hawks (*Buteo jamaicensis*) occupied two sites in Rattlesnake Coulee, one produced 3 young and one brancher was observed at the other; most likely the pair produced >1 young.

the best bivalve < 1 mm
Cortical silt thickness & young sand are probably most common in the
west (unpublished). Red-sailed Hawaii (Gulf of California) occupies two sites in Baja California
Other Ounalashka Harbor. - The SW basin of Alaska (gulf of Alaska) was incorporated
into the site in KARRA, one in A29 and one in the south East site (Fig. 5). Position
of sediment sites in KARRA, one in A29 and one in the south East site (Fig. 5).

The width of sites on sand plain varied during summer for over a decade.
benthic % sand, the adult sedges were replaced by grasses (Table 5).
Golden Gate-Golden Gate were successful in the leaf in KARRA (Fig. 5).
leaf) of Prairie Islands, Kauai Rum Racer Shelly A1a, SOOT.
Figure 4. Beginning successional patterns during tidal (sea

Figure 5. Location and minimum productivity (nest fail) of other raptor pairs, Kevin Rim Raptor Study Area, 1994. Golden Eagle pairs 3 and 4 (# within nest) were successful but pairs 1 and 2 were absent (see Appendix Table 3). Young





No *Togolomis* banding surveys or ground squirrel burrow counts were conducted in 2004.

Figure 5. Location and minimum productivity (see text) of other raptor pairs, Kevin Rim Raptor Study Area, 2004. Golden Eagle pairs 3 and 4 (# within icon) were successful but pairs 1 and 2 were absent (see Appendix Table 3). Young produced are in parentheses adjacent to species

There is a p icon. The Kevin Rim area has thus far identified only three species of the 11 that have been recorded in the county. Most of the other species recorded have been from Tiber Reservoir (Faulkner 2000). Search efforts during this study were

Table 3. Minimum Golden Eagle and other Buteo hawk activity in the Kevin Rim Raptor Study Area, 2004.

Species	Nesting Area	Breeding Areas	Young per Active Breeding Area	
			Active	Fledged
Golden Eagle	Primary Study	1	2	20
	Rattlesnake	1	1	10
	Total	2	3	15
Swainsons Hawk	Primary Study	2	? ¹	
	Northeast Flats	1	? ¹	
	Total	3		
Red-tailed Hawk	Rattlesnake	2	>4	>20

¹Incubating.

Prey Availability

No lagomorph headlight surveys or ground squirrel burrow counts were conducted in 2004.

Habitat Type	Search Type	Total Time	Species encountered
Herptiles	Man made pond	Listening	156 min. Plains spadefoot toad

There is a paucity of data on reptile and amphibian species in Toole County. Herpetological searches in the Kevin Rim area have thus far identified only three species of the 11 that have been recorded in the county. Most of the other species recorded have been from Tiber Reservoir (Rauscher 2000). Search efforts during this study were unsuccessful in located additional distribution of species which seem likely for that area, based on habitat characteristics.

No specimens were encountered during the general area reconnaissance nor during driving searches. However, those searches were valuable in determining access routes, distribution of habitat, and prioritizing search areas. Listening and walking searches were more productive. Only two species, the Plains spadefoot toad (*Spea bombifrons*) and the Western rattlesnake (*Crotalus viridis*) were encountered (Table 4).

At the man made pond where a listening survey was conducted, an estimated 10-100 individuals were calling the night of 1 July. On 2 July, another pond was visited during a walking search that contained an estimated 1000-3000 large tadpoles of this species. Identification of tadpoles is based on Maxell et al. (2003).

Rattlesnakes are rumored to be common in the area, but proved to be somewhat elusive. Only two were found, both during walking searches along the cliff base along the South Rim, an area that is covered with rock/ali providing excellent cover for this species.

In addition to Table 4. Non-vehicular reptile and amphibian search types, times, and results, Kevin Rim Raptor Study Area, 2004.

Habitat Type	Search Type	Total Time	Species encountered
Man made pond	Listening	156 min.	Plains spadefoot toad
Man made pond	Walking	68 min.	Plains spadefoot toad
Grassland bench	Walking	120 min.	None
Cliff base	Walking	83 min.	Western rattlesnake
Shrub/grass draw	Walking	77 min.	None
Temporary stream	Walking	28 min.	None

Spadefoot toads are explosive breeders, in that they emerge from underground burrows only after a rain, then quickly breed and go back into burrows as the habitat dries out. At the man made pond where a listening survey was conducted, an estimated 10-100 individuals were calling the night of 1 July. On 2 July, another pond was visited during a walking search that contained an estimated 1000-3000 large tadpoles of this species. Identification of tadpoles is based on Maxell et al. (2003).

Rattlesnakes are rumored to be common in the area, but proved to be somewhat elusive. Only two were found, both during walking searches along the cliff base along the South Rim, an area that is strewn with rockfall providing excellent cover for this species.

In addition, locations of two specimens from the valley area to the south and east of the Kevin Rim formation were recirded. Location of all specimens is provided in Table 5.

The Boreal chorus frog (*Pseudacris maculata*) was not encountered, but is certainly present, as it has been recorded in this area previously (Maxell et al. 2003). Listening surveys for this species need to be conducted in May, but this effort was not initiated until the end of June when temporary streams were nearly dried up. An earlier effort would have revealed the presence of this species, probably in abundance.

again occurred at a sensitive time for raptor nestings. Young Ferruginous Hawks would have been between 20 and 25 days old and less than 50% feathered in mid-June.

(Mark) Table 5. Reptile and amphibian encounters, Kevin Rim Raptor Study Area, 2004.

Date	Species	No.	Size/Age	UTM
		*		
7-1-04	Crvi	1	Lg. Ad.	12U 0424164 5404368
7-1-04	Spbo	10-100	Ad.	12U 0422230 5402087
7-1-04	Crvi	1	Ad. (MR)	12U 0423499 5402980
7-1-04	Crvi	1	Juv. (MR)	12U 0421051 5402840
7-2-04	Spbo	1000- 3000	Larvae	12U 0425778 5404772
8-17-04	Crvi	1	Sm. Ad.	12U 0424010 5403799

*Crvi = Western rattlesnake, Spbo = Plains spadefoot toad.

DISCUSSION

Ferruginous Hawk success in PSA increased slightly over 2003 (Harmata and Jaffee 2003) but was still well below the 16 year mean. Productivity comparisons are more tenuous because of extended observation ranges employed since 1998. At extended ranges, the probability of missing nestlings increases. Unlike 2003, Ferruginous Hawk success and productivity was absent in the flats in 2004. Heavy rains in mid June again occurred at a sensitive time for raptor nestlings. Young Ferruginous Hawks would have been between 20 and 25 days old and less than 50% feathered in mid June (Moritsch 1985). Plumage composition at this time protects against most weather but not moisture and eavy rains may have affected survival of Ferruginous Hawk nestlings. However, whether nestling mortality or lack of egg laying by adult hawks affected success is not known.

Prairie Falcon success and productivity declined slightly in 2004. Eyries may not be immune to flooding from runoff or direct rain, depending on winds and exposure. However, nesting phenology was earlier in 2004 than most previous years and nearly all young falcons detected had fledged. Detecting fledged falcons is difficult without extended monitoring time at each eyrie and minimal observation time most likely affected recorded productivity.

Golden eagles continue to persist at low levels. The pair on the South Rim was not seen despite 3 days of observations in 2004. They have been observed at least once each year of study and their absence is troubling. Site G4 is about mid way between G2 and G3 and there has never been a Golden Eagle nest on that section of North Rim (Fig. 5) since surveys began 1988. G4 may represent a new pair pioneering a

MANAGEMENT RECOMMENDATIONS

Raptors

Management recommendations presented in Hartman and Gobler (2002) are still new breeding area, turnover of one of the breeding pair from G2, or the pair from G2 reducing human impacts on nesting capture. We advocate active moving to a new site.

Discouragement can be utilized to promote North Rim public lands as a destination for any type of outdoor recreation.

As a result of fair precipitation in 2002, 2003, and 2004 ground vegetation in KRRSA was more lush over a more extensive area than has occurred in a decade. Verdant vegetation may have further reduced hawk and falcon productivity due to difficulty of detection and capture of principal prey (Richardson's ground squirrels and terrestrial birds).

There was again a noticeable absence of raptors along the North Rim and Badlands (Figs. 2 & 3). Where as many as seven pairs of hawks nested in the past, none were present in 2004. Not even single adults were seen. Continued absence of successful hawks and falcons is troubling and we are still at loss for an explanation. Depressing factors are either very subtle or exerted at a time observers are absent. More than a decade of declining productivity may be a component of a normal, long-term cyclic pattern or indicative of populations under stress.

LITERATURE CITED

- Casey, C. 1893. Hypotheses concerning the causes of the disappearance of several kinds from the mountains of Colorado. *Copeia*, No. 7:355-362.

new president will move to one of the pending bills now. or the best known GS
will be won at division

As a result of last publication in 2004, the 2005, 2005 in KGBA was more than over a more expensive and than less demanding in a class.
KGBA may have been more than over a more expensive and less demanding in a class.
High level education may have higher tuition fees and less demand due to difficult
of selection and choice of publics by (Responsible, a strong element and less demand
public

There may also a number of reasons to reduce from the Ministry Bill and
Gardens (Fig. 5 g.). When as well as seven sets of law in the best
and more than taught in 2004. Not even single subjects were zero. Continuing presence of
academic parks and focuses in teaching and training and we are still in loss for the education.
Developing people the right and supply to each is a firm operates the market. More
than a degree of academic credibility may be a component of a normal long-term choice
between the indicative of potentialities under stress.

MANAGEMENT RECOMMENDATIONS

Conner, P.S., and J.C. Fogelman. 1984. Extinction of montane populations of northern
Raptors (spotted owl (*Strix occidentalis*) in Colorado. *J. Migrator.* 18: 147-152.

Dubois: Management recommendations presented in Harmata and Gabler (2000) are still appropriate, especially the need for an integrated Kevin Rim Raptor Management Plan, directed specifically at reducing human impacts on nesting raptors. We advocate active discouragement of any attempt to promote Kevin Rim public lands as a destination for any type of spring-summer recreational activity (*i.e.*, birding, off-road vehicle, hiking).

Herptiles (1991). Impacts of oil and gas development on prairie associated with the

Survey timing in 2004 was appropriate for the reptile species anticipated to occur in the Kevin Rim area. However, the Boreal chorus frog breeds earlier in the season, and listening searches should be conducted in mid-May. A more comprehensive view of the reptile and amphibian community could be attained by conducting surveys monthly, from May through August. *Challenge-Cow Sheep Progress Report 1990, Chalk Ranch, MDT Bureau Land Management, Great Falls, MT.*

Oil production in the area may have impacted the reptile and amphibian community, possibly reducing density of some species, and perhaps compromising species diversity. The magnitude of this impact is presently unknown, and would require a detailed research plan incorporating an appropriate control area.

C. Olson, and H. Gabler. 1999. Population dynamics of key raptor species
in the Kevin Rim Raptor Study Area. 1999. *Challenge-Cow Sheep Progress Report*
for Bureau of Land Management, 22 pp.

LITERATURE CITED

Carey, C. 1993. Hypothesis concerning the causes of the disappearance of boreal toads from the mountains of Colorado. *Cons. Biol.* 7:355-362.

- Corn, P.S. and J.C. Fogelman. 1984. Extinction of montane populations of northern leopard frog (*Rana pipiens*) in Colorado. *J. Herpetol.* 18: 147-152.
- Dubois, K.L. 1988. High nesting density of birds of prey near Kevin, Montana. Final Report. USDI Bureau Land Manage., Great Falls, MT. 8 pp.
- Flath, D. L. 1991. Species of special interest or concern. Montana Dept. of Fish, Wildlife, and Parks. Wildlife Division, Helena, Mont. 7pp.
- Harmata, A.R. 1991. Impacts of oil and gas development on raptors associated with the Kevin Rim, Montana. Unpubl. Report, USDI, Bureau Land Manage., Great Falls, MT. 80 pp.
- _____. and J. R. Zelenak. 1996. Population dynamics of key raptors nesting in the Kevin Rim area. Challenge Cost Share Progress Report 1996. Unpubl. Report., USDI, Bureau Land Manage.,Great Falls, MT.
- _____, P. J. Harmata, and C. Olsen. 1998. Population Dynamics of Key Raptor Species nesting on the Kevin Rim, Montana. Challenge Cost Share Progress Report 1997-1998. Unpubl. Report., USDI, Bureau Land Manage.,Great Falls, MT. 12 pp.
- _____, C. Olson, and H. Gabler. 1999. Population dynamics of key raptor species in the Kevin Rim Raptor Study Area, 1999. Challenge Cost Share Progress Report to: Bureau of Land Management, Great Falls District. 22 pp.

_____. and H. Gabler. 2000. Population Dynamics of Key Raptor Species nesting on the Kevin Rim, Montana, 2000. Challenge Cost Share Progress Report. Unpubl. Report., USDI, Bureau Land Manage., Great Falls, MT. 16 pp.

_____. and R. Jaffe. 2001. Population Dynamics of Key Raptor Species nesting on the Kevin Rim, Montana, 2001. Challenge Cost Share Progress Report. Unpubl. Report., USDI, Bureau Land Manage., Great Falls, MT. 16 pp.

_____. and R. Jaffe. 2003. Success and productivity of key raptor species nesting in the Kevin Rim Raptor Study Area, 2002 -2003. Challenge Cost Share Progress Report to Bureau of Land Management Great Falls District. 12 pp.

Hendricks, P. 1999. Amphibian and Reptile Survey of the Bureau of Land Management Miles City District, Montana. Montana Natural Heritage Program. Helena. 80 pp.

Joslin, G. and H. Youmans. Coordinators. 1999. Effects of recreation on Rocky Mountain wildlife: A Review for Montana. Committee on Effects of Recreation on Wildlife, Montana Chapter of The Wildlife Society. 307 pp.

Koch, E.D. and C.R. Peterson. 1995. The amphibians and reptiles of Yellowstone and Grand Teton National Parks. Univ. of Utah Press. Salt Lake City. 188 pp.

Maxell, B.A. 2000. Management of Montana's amphibians: a review of factors that may present a risk to population viability and accounts on the identification, distribution, taxonomy, habitat use, natural history, and the status and conservation of individual species. Report to USFS Region 1, Order Number 43-0343-0-0224. Univ. of Mont., Wildlife Biol. Prog., Missoula. 161 pp.

and H. Gable, 2000. Population Dynamics of Key Raptor Species
nesting in the Kain Rim Mountains, 5000'. Challis Co. Idaho. Birders Report
Quarterly 26(4): 180-186.

and R. Telfer, 2001. Population Dynamics of Key Raptors Breeding within
the Kain Rim Mountains, 5000'. Challis Co. Idaho. Birders Report
Quarterly 27(4): 16-19.

and R. Telfer, 2003. Success and Productivity of Key Raptors breeding
within the Kain Rim Mountains, 5000'-5003'. Challis Co. Idaho. Birders Report
Quarterly 29(4): 15-18.

Henderson, R., 1992. A Comparison and Review of the Status of Land Management
units in Canada. Mountain Hareline Project, Helena, 80 pp.

Jouin, C. and H. Yamazaki, 1998. Effects of logging on Rock Wallabies.
Wildlife: A Review for Managers. Moutain Hareline Project, Helena, 50 pp.

Keller, E.D. and D.R. Stinson, 1988. The relationship and types of Yallowstone and
Cloud Cap National Parks. Univ. of Texas Press, San Antonio, 188 pp.

Miller, B.A., 2000. Management of Mountain's shrublands: a review of recent literature
and a look to population viability and stochasticity in the identification, distribution,
conservation, habitat use, human impact, and life stages and conservation of individual
species. Report to USFS Region 4, Contract #A-0343-0-0554, Univ. of
Montana Chapter of The Wildlife Society, 301 pp.

- Yost, R. C. 1993. Ferruginous Hawk and Prairie Falcon: Reproductive and behavioral studies. M.S. Thesis. Montana State University, Bozeman. 12 pp.
- Maxell, B.A., J.K. Werner, P. Hendricks, and D.L. Flath. 2003. Herpetology in Montana: A History, Status Summary, Checklists, Dichotomous Keys, Accounts for Native, Potentially Native, and Exotic species, and Indexed Bibliography. Soc. For Northwestern Vert. Biol., Northwest Fauna #5. 138. pp.
- Montana Natural Heritage Program. 1999. Animal species of special concern. Montana Natural Heritage Program. Helena. 8pp.
- Moritsch, M. Q. 1985. Photographic guide for aging nestling ferruginous hawks. U.S. Dept. of Interior, Bureau of Land Management, Snake River Birds of Prey Project, Boise District, Idaho. 19 pp.
- Palmer, R.S. 1988. Handbook of North American Birds. Vol. 4. (Part 2). Yale Univ. Press, New Haven and London. 465 pp.
- Reichel, J.D. and D.L. Flath. 1995. Identification guide to the amphibians and reptiles of Montana. Montana Outdoors 26: 15-34.
- Rauscher, R.L. 2000. Amphibian and Reptile Survey on Selected Montana Bureau of Reclamation Impoundments. Montana Dept. Fish, Wildlife and Parks, Nongame Program. Bozeman.
- U.S. Fish & Wildlife Service. 2003. Species of Conservation Concern. U.S. Dept. of Interior, Fish & Wildlife Service, Ecological Services Division, Helena, Montana.

APPENDIX TABLES

VanHorn, R. C. 1993. Ferruginous Hawk and Prairie Falcon reproductive and behavioral responses to human activity near Kevin Rim, Montana. M.S. Thesis. Montana State Univ., Bozeman. 86 pp.

Williams, D. C. and F. Campbell. 1988. How the Bureau of Land Management designates and protects areas of critical environmental concern: a status report, with a critical review by the Natural Resources Defense Council, Nat. Areas J. 8: 231-237.

Zelenak, J. R. 1996. Breeding behavior, nest success, productivity and survival of Ferruginous Hawks at the Kevin Rim in northern Montana. M.S. Thesis. Montana State Univ., Bozeman. 72 pp.

Zelenak, J.R., J.J. Rotella, and A.R. Harmata. 1997. Survival of fledgling ferruginous hawks in northern Montana. Can. J. Zool. 75:152-156.

Zug, G.R. 1993. Herpetology. Academic Press, Inc., San Diego. 527 pp.

Winnert, R. C. 1993. Ferruginous Hawk and Prairie Falcon reproductive and predation
habitat use of human activity near Kavir River, Montana. M.S. Thesis, Montana State
University, Bozeman, 66 pp.

Williams, D. C. 1995. Conservation of Land Management
Activities and Public Interest Concerns: A Study of the
National Resource Defense Council, Inc. Ames, Ia. 511 pp.
NFS

Woodcock, T. R. 1988. Breeding behavior, nest success, longevity and survival of
Ferruginous Hawks at the Kavir River in northern Montana. M.S. Thesis, Montana
State University, Bozeman, 55 pp.

Yerolemou, G., J. C. Stiglitz, and A. R. Harberger. 1991. Summary of findings from the
Survey of Northern Mountain Cu, 1990. LS-125-126
Forest of Northern Montana. 19 pp.

Yule, G.R. 1993. Hydrology. Academic Press, Inc., San Diego, 252 pp.

APPENDIX TABLES

Appendix Table 1. Location, minimum productivity (nestlings >4 wks old)¹, and plumage descriptions (N = normal, M = melanistic) of nesting Ferruginous Hawks, Kevin Rim Raptor Study Area, 2004.

Nest #	Nesting District	UTM ²		Land Ownership	Number/Plumage		Name
		Eastin g	Northing		Adult	Nestlings	
F0	Int. V	41995 0	540500 0	Private	2N	4N	W Boundary
F1	Int. V	42090 0	540610 0	MT State			W Pinnacle
F2	Int. V	42239 0	540587 5	MT State			Int. Valley N
F3	Int. V	42206 0	540547 5	MT State			Int. Valley M
F3A	Int. V	42236 0	540470 0	Private	2N		Int. Valley S
F4	S. Rim	42120 0	540364 0	Private	2N	4N	W Rim
F5	S. Rim	42173 0	540329 0	Private			Falcon Squeezed
F5B	S. Rim	42223 0	540321 0	BLM	2N	3N	Prairie Point E
F5A	S. Rim	42337 5	540346 0	BLM	2N	4N	Look Over
F6	S. Rim	42455 0	540504 0	BLM			Eagle Blind
F6A*	S. Rim	42495 0	540575 0	BLM	_M	2N	TP Rings W
F7	S. Rim	42634	540790	BLM	2N		TP Rings N

APPENDIX TABLES

Abundance-Taxis I. Ecological minimum biotic diversity (see also $A < M \leq A'$) and
abundance distribution ($M = M_{\text{min}} + M_{\text{max}}$) of selected Flora

Hawea, North Penn Plateau Study Area, 2004

Site	Name	Non-pasture			Pasture			Mean % Diameter Diameter	Mean % Height Height
		Min	Max	Mean	Min	Max	Mean		
W. Boundary	W. Boundary	0	0	0	0	0	0	0	0
W. Boundary	W. Boundary	0	0	0	0	0	0	0	0
Up Valley N	Up Valley N	0	0	0	0	0	0	0	0
Up Valley N	Up Valley N	0	0	0	0	0	0	0	0
Up Valley S	Up Valley S	0	0	0	0	0	0	0	0
Up Valley S	Up Valley S	0	0	0	0	0	0	0	0
Up Hill	Up Hill	0	0	0	0	0	0	0	0
Up Hill	Up Hill	0	0	0	0	0	0	0	0
Up Slope	Up Slope	0	0	0	0	0	0	0	0
Up Slope	Up Slope	0	0	0	0	0	0	0	0
Point Point E	Point Point E	0	0	0	0	0	0	0	0
Point Point E	Point Point E	0	0	0	0	0	0	0	0
Rock Out	Rock Out	0	0	0	0	0	0	0	0
Rock Out	Rock Out	0	0	0	0	0	0	0	0
Edge Slope	Edge Slope	0	0	0	0	0	0	0	0
Edge Slope	Edge Slope	0	0	0	0	0	0	0	0
Up Valley W	Up Valley W	0	0	0	0	0	0	0	0
Up Valley W	Up Valley W	0	0	0	0	0	0	0	0
Up Valley N	Up Valley N	0	0	0	0	0	0	0	0
Up Valley N	Up Valley N	0	0	0	0	0	0	0	0

		0	0				
F8	S. Rim	42682	540898	MT State	_M	3N	Dark Dad
		5	0				
F9	N. Rim	42742	541020	BLM	3W	3N	Fossil Find
		0	0				
F9A	N. Rim	42666	540900	MT State	2N	2N	Rock Art
		5	0				
F10	N. Rim	42513	541195	Private			Big Valley
		0	0				
F11	N. Rim	42475	541342	BLM			Rotella
		0	5				
F12	Rattl. C.	42491	541618	Private			Davis Place
		0	0				
F13	Rattl. C.	42522	541677	Private		1N	Nobody Home
		5	5				
F14	Rattl. C.	42606	541701	Private			Ground
		0	0				
F15	Rattl. C.	42544	541757	Private			Cartridge
		0	5				
F16	Rattl. C.	42410	541827	Private	2N		Bull Pasture
		0	5				
F16A	Rattl. C.	42272	541780	Private			Last Lake
		5	0				
F17	Badland		gone	Private			Broken Cliff
	s						
F18	Badland		gone	BLM			Mud Bank
	s						
Platform	Badland	43039	541001	MT State			W Platform
	s	5	0				
Platform	Badland	43043	541003	Private			E Platform
	s	0	0				
F19*	N. Rim	42545	541430	BLM			Fox Kit

		0	0				
F20*	Ratt. C.	42370	541542	Private	2N	4N	Spring Gulch
		0	5				
F21	N. Flats	43002	541640	Private	2N	3N	Stock Pond
		5	0				
F22	N. Flats		gone	Private			Simmes Pond
F23	SE Flats	43690	539925	Private			Kevin Exit
		0	0				
F24	SE Flats	43582	539547	Private			W I-15 E
		7	4				
F25	SE Flats	43410	539541	Private			W I-15 W
		8	5				
F26	SE Flats	44055	540094	Private			Oil Tank
		1	2				

¹Observation distance maximized to prevent disturbance; some nestlings may have been missed.

²UTMs obtained from map plots, *not* GPS readings; so all you nouveau raptor elitists take note and don't criticize.

*Indicates nest new in 2004.

Appendix Table 2. Location and productivity (nestlings >4 wks old) for Prairie Falcon breeding areas located within the Kevin Rim Raptor Study Area, 2004.

Breeding Area #	Nesting District	UTM		Land Ownership	Productivity n 2004	Name
		Easting	Northing			
P1	S. Rim	424200	540350	Private	≥1 ^a	Bookcase
			0			
P2	S. Rim	422350	540340	Private	≥2 ^a	
			0			
P3	S. Rim	422950	540337	BLM	≥1 ^a	
			5			
P4	S. Rim	423510	540354	Private	≥1 ^a	Radio Shack
			0			
P4A	S. Rim	424150	540480	BLM		
			0			
P5	S. Rim	425525	540822	BLM		TP Rings
			5			
P5A	S. Rim	425700	5407150	BLM	≥1 ^a	Hoodoos
P5C	S. Rim	426650	540775	BLM	≥3 ^a	Upper TP Bowl
			0			
P6	S. Rim	427475	540895	MT State	?	S. Finger
			0			
P7	S. Rim	427475	540977	MT State		Zelonic's Ticks
			5			
P7A	S. Rim	427420	5410250	BLM		Fossil Point
P8	N. Rim	424690	5412780	BLM		
P9	Rattl. C.	425400	5413800	BLM		
P9A	Rattl. C.	424360	5415660	Private	≥2 ^a	Red-tail

nesting pair locations and productivity (fledglings >1 and <1) for Cooper's Hawk (n = 1), Northern Harrier (n = 1), and Red-tailed Hawk (n = 1) in the Beaver River Fluvial Study Area, 2009.

P9B	Rattl. C.	425325	5414300	BLM	^b	
P10	Rattl. C.	425210	5416280	Private		
P10A	Rattl. C.	425110	5416880	Private		
P11	Rattl. C.	423590	5418025	Private		
P12	Rattl. C.	424690	5417450	Private	≥3	Eagle Food
P13	Rattl. C.	422750	5417250	Private	≥5 ^a	Last Lake S.
P13A	Rattl. C.	423550	5417580	Private		Interlake S.

^aFledged.

^bOne adult present.

	10	PM	000000	201508	201508	201508	201508
Empire	10	PM	000000	201508	201508	201508	201508
B/plus	10	PM	000000	201508	201508	201508	201508
B/plus	10	PM	000000	201508	201508	201508	201508
B/plus	10	PM	000000	201508	201508	201508	201508
Empire	10	PM	000000	201508	201508	201508	201508
Empire	10	PM	000000	201508	201508	201508	201508
Empire	10	PM	000000	201508	201508	201508	201508

Empire
201508

Appendix Table 3. Location and productivity (nestlings >4 wks old) for Golden Eagle (prefix G), Swainson's Hawk (prefix S), and Red-tailed Hawk (prefix R) breeding areas located within the Kevin Rim Raptor Study Area, 2004.

Breeding Area #	Nesting District	UTM		Land Ownership	Productio n 2004	Name
		Easting	Northing			
G1	S. Rim	424175	540420	BLM	^a	S. Rim
			0			
G2	N. Rim	426480	540967	MT State		Petroglyph
			5			
G3	Rattl. C.	424625	5417325	Private	1	Simmes
G4	N. Rim	425700	5413775	BLM	2 ^b	Red Fox Kit
S1	S. Rim	424850	540555	BLM	Incubating	TP Ring Spring
			0			
S2	NE Flats	429350	5416500	Private	Incubating	Sunburst Road
S3	NE Flats	429500	5413675	Private	Incubating	Lone Tree
R1	Rattlesnake Coulee	424700	5415700	Private	≥1 ^c	Homestead
R2	Rattlesnake Coulee	424700	5415700	Private	≥3	Last Lake S.

^aNo adults present.

^bNew nest site.

^cFledged.

Aboriginal Tribes of Canada (excluding Nunavut) (excluding Nunavut) for Census
 Eagle (Census), and Bald-tailed Hawk (excluding)
 Bear (Census), and Mountain Goat (excluding)

Name	Number	Population	MTU		Population	Percentage	Borough
			First	Second			
Aboriginal Tribes of Canada (excluding Nunavut) for Census	1	1	MJW	S40450	45412	98.9%	ND
Bald-tailed Hawk (excluding)	1	1	MT Sable	S40362	45480	98.9%	ND
Eagle (Census)	1	1	MT Sable	S41352	45482	98.9%	ND
Mountain Goat (excluding)	1	1	MT Sable	S41352	45482	98.9%	ND
Nunavut	1	1	MT Sable	S41352	45482	98.9%	ND
Aboriginal Tribes of Canada (excluding Nunavut) for Census	1	1	MT Sable	S41352	45482	98.9%	ND
Bald-tailed Hawk (excluding)	1	1	MT Sable	S41352	45482	98.9%	ND
Eagle (Census)	1	1	MT Sable	S41352	45482	98.9%	ND
Mountain Goat (excluding)	1	1	MT Sable	S41352	45482	98.9%	ND
Nunavut	1	1	MT Sable	S41352	45482	98.9%	ND
Aboriginal Tribes of Canada (excluding Nunavut) for Census	1	1	MT Sable	S41352	45482	98.9%	ND
Bald-tailed Hawk (excluding)	1	1	MT Sable	S41352	45482	98.9%	ND
Eagle (Census)	1	1	MT Sable	S41352	45482	98.9%	ND
Mountain Goat (excluding)	1	1	MT Sable	S41352	45482	98.9%	ND
Nunavut	1	1	MT Sable	S41352	45482	98.9%	ND

Aboriginal Tribes of Canada (excluding Nunavut) for Census
 Bald-tailed Hawk (excluding)
 Eagle (Census)
 Mountain Goat (excluding)